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TITLE : NI BASE ALLOY AND ITS MANUFACTURE

ABSTRACT : PURPOSE: To obtain Ni base alloy having a high strength, further superior stress corrosion cracking resistance in high temp. and pressure water, by specifying metallographic structure and contents of C, Si, Mn, Fe, Cr, Mo, Ti, Al, Nb, rare earth element, Mg, Ca in Ni base alloy.

CONSTITUTION: The Ni base alloy contains, by weight $\leq 0.08\%$ C, $\leq 0.15\%$ Si, $0.1\sim 1\%$ Mn, $\leq 15\%$ Fe, $20\sim 30\%$ Cr, $\leq 10\%$ Mo, $\leq 3.5\%$ Ti, $\leq 2\%$ Al, $\leq 7\%$ Nb and $\leq 0.1\%$ one kind or more among respective rare earth element, Mg and Ca and the balance Ni, has γ' phase and/or γ'' phase in γ matrix, and $M_{23}C_6$ are semicontinuously and preferentially pptd. at grain boundaries. For obtaining the alloy, soln. heat treatment composed of heating, holding at $980\sim 1,200^\circ\text{C}$ and cooling, then further aging treatment at one time or more of heating and holding at $550\sim 850^\circ\text{C}$ are applied to alloy having the compsn. In case of cold and hot workings, working by $\geq 10\%$ percentage reduction in area and that at $850\sim 1,250^\circ\text{C}$ by $\geq 20\%$ draft are applied after and before soln. heat treatment, respectively.

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